

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY



(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference XA1837	<b>FOR FURTHER ACTION</b> See Form PCT/PEA/416	
International application No. PCT/GB2004/003469	International filing date (day/month/year) 11.08.2004	Priority date (day/month/year) 05.09.2003
International Patent Classification (IPC) or national classification and IPC F41J9/10, F42B10/18		
Applicant BAE SYSTEMS PLC ET AL.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 3 sheets, as follows:</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand  15.06.2005	Date of completion of this report  07.12.2005	
Name and mailing address of the International preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer  Menier, R  Telephone No. +31 70 340-4405  	

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**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/GB2004/003469

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

**Description, Pages**

1-10 as originally filed

**Claims, Numbers**

1-17 received on 15.06.2005 with letter of 13.06.2005

**Drawings, Sheets**

1/9-9/9 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/GB2004/003469

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-17
	No: Claims	
Inventive step (IS)	Yes: Claims	1-17
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-17
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

- 1 Reference is made to the following documents:  
D1: EP0768508 A  
D2: FR2175133 A  
D3: US3861627 A
- 2 The document D1 is regarded as being the closest prior art to the subject-matter of independent claim 1, and shows (the references in parentheses applying to this document) a towed body (2) (col.2, l.9) comprising:  
a body portion (fig.1);  
a support member (6) mounted on the body portion, the support member (6) being movable with respect to the body portion in a general rearward direction along a section thereof (col.2, l.16);  
a plurality of forward opening blades (4+5) pivotally mounted on the support member (6) and lying adjacent to the body portion in a stowed position, the blades (4+5) defining a drag cone when in a fully deployed position (col.2, l.17-19, l.54-56; fig.2a).
- 3 The subject-matter of independent claim 1 therefore differs from this known towed body in that the towed body of the application comprises a deployment mechanism associated with the support member for causing movement in the generally rearward direction, the deployment mechanism including ramp means for deploying the blades, a hub member releasably mounted on the body portion, the hub member having at least one surface on which fluid through which the towed body is towed acts to effect movement in the generally rearward direction, and locking means for locking the blades in the fully deployed position.
- 4 The subject-matter of independent claim 1 is therefore new (Article 33(2) PCT).
- 5 The problem to be solved by the present invention may therefore be regarded as

avoiding the blades being damaged during their deployment (description, p.2, l.4-11).

- 6 The solution to this problem proposed in independent claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

Although document D2 describes a deployment mechanism for self-propulsed projectile which includes ramps means and locking means, there is no hint about a releasable hub member having a rearward movement due to the fluid through which the body is towed. In D2, the blades are deployed by inertia, in D3, by spring force and, in these two documents, there is no surface on the blades on which the fluid could exert a pressure for the deployment. A deployment mechanism for towed body comprising a releasable hub member deployed rearwardly by aerodynamic forces is neither suggested by the combination of D1, D2, D3 nor by any of the other available documents.

- 7 Claims 2-17 are dependent on independent claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

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CLAIMS:

1. A towed body comprising:-

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a body portion;

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a support member mounted on the body portion, the support member being movable with respect to the body portion in a generally rearward direction along a section thereof;

a plurality of forward opening blades pivotally mounted on the support member and lying adjacent the body portion in a stowed position, the blades defining a drag cone when in a fully deployed position; and

a deployment mechanism associated with the support member for causing movement in the generally rearward direction, the deployment mechanism including ramp means for deploying the blades, a hub member releasably mounted on the body portion, the hub member having at least one surface on which fluid through which the towed body is stowed acts to effect movement in the generally rearward direction, and locking means for locking the blades in the fully deployed position.

2. A towed body according to claim 1, wherein the hub member is mounted on the support member.

3. A towed body according to claim 1, wherein the hub member abuts the support member.

4. A towed body according to any one of the preceding claims, wherein the hub member comprises at least two interlocking hub portions.

5. A towed body according to claim 4, wherein each hub portion includes at least two moveable sections, each section being extendable in a generally radial direction away from the body portion.

6. A towed body according to claim 4 or 5, wherein each hub portion has a front face, the front face including a plurality of recesses formed therein.

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7. A towed body according to any one of the preceding claims, wherein the hub member includes a plurality of rear opening blades lying in a stowed position along the body portion that opens to form a generally disc-shaped surface in their deployed position.
- 5 8. A towed body according to claim 7, wherein the rear opening blades fold rearwards from their deployed position when the forward opening blades are fully deployed.
9. A towed body according to claim 7, wherein the rear opening blades are jettisoned from their deployed position when the forward opening blades  
10 are fully deployed.
10. A towed body according to claim 7, wherein the rear opening blades remain in their deployed position when the forward opening blades are fully deployed.
11. A towed body according to any one of claims 7 to 10, wherein the rear  
15 opening blades are substantially shorter than the forward opening blades.
12. A towed body according to any one of the preceding claims, wherein the deployment mechanism further includes guide means for guiding the movement of the support member in the generally rearward direction.
13. A towed body according to claim 12, wherein the guide means includes at  
20 least two slots formed in the body portion and pins attached to the hub member, the pins sliding in the slots along the body portion.
14. A towed body according to claim 13, wherein the slots include run-outs at a rearward end thereof for effecting release of the hub member.
15. A towed body according to any one of the preceding claims, wherein the  
25 locking means comprises a snap ring mounted in the support member, the snap ring engaging with a groove formed in the body portion.

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16. A towed body according to claim 15 when dependent on claim 14, wherein the groove is formed adjacent the run-out.
17. A towed body according to claim 16, wherein the relative positions of the groove and the ramp means and of the locking means and the pivotal mounting for the blades on the support member together define the diameter of the drag cone formed by the fully deployed forward opening blades.

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